

NetCDF_Attribute_Convention_for_Dataset_Discovery

The netCDF Group at Unidata has recommended netCDF attributes for data discovery. Many of these attributes correspond to general discovery metadata content, so they are available in many metadata standards. This page includes the Unidata crosswalk to THREDDS and adds the crosswalk to ISO 19115-2. Note that the attribute names link to the Unidata definitions. Many of these elements are included in the ISO Core specification. They are indicated in this Table by an M, O, or C in parentheses. An ?M? indicates that the element is mandatory. An ?O? indicates that the element is optional. A ?C? indicates that the element is mandatory under certain conditions.

A Conformance Test is available for this convention.

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Metadata Link

The netCDF metadata model is focused on providing "use metadata" for the data included in the file (or granule). Other metadata dialects (i.e. ISO 19115) can provide information about collections and more details about the dataset. In order to make users aware of that additional metadata we recommend adding a global attribute named "Metadata_Link" to the netCDF file. The value of this attribute is a URL that gives the location of the more complete metadata. This element is not included in the current version of the NetCDF Attribute Convention for Dataset Discovery.

Highly Recommended

Attribute	Description	THREDDS	
title	A short description of the dataset.	dataset@name	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MI_
summary	A paragraph describing the dataset.	metadata/documentation[@type="summary"]	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MI_

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<u>keywords</u>	A comma separated list of key words and phrases.	metadata/keyword	/gmi:MI_Metadata/gmd:identificationInfo/gmd:Keyw
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Recommended

Attribute	Description	THREDDS	
<u>id</u>	The combination of the "naming authority" and the "id" should be a globally unique identifier for the dataset.	dataset@id	/gmi:MI_Metadata
<u>naming_authority</u>			
<u>keywords_vocabulary</u>	If you are following a guideline for the words/phrases in your "keywords" attribute, put the name of that guideline here.	metadata/keyword@vocabulary	/gmi:MI_Metadata
<u>cdm_data_type</u>	The THREDDS data type appropriate for this dataset.	metadata/dataType	/gmi:MI_Metadata May need some
<u>history</u>	Provides an audit trail for modifications to the original data.	metadata/documentation[@type="history"]	/gmi:MI_Metadata
<u>comment</u>	Miscellaneous information about the data.	metadata/documentation	/gmi:MI_Metadata
<u>date_created</u>	The date on which the data was created.	metadata/date[@type="created"]	/gmi:MI_Metadata /gmd:dateType
<u>creator_name</u>	The data creator's name, URL, and email. The "institution" attribute will be used if the "creator_name" attribute does not exist.	metadata/creator/name	/gmi:MI_Metadata CI_RoleCode=
<u>creator_url</u>		metadata/creator/contact@url	/gmi:MI_Metadata
<u>creator_email</u>		metadata/creator/contact@email	/gmi:MI_Metadata
<u>institution</u>		metadata/creator/name	/gmi:MI_Metadata
<u>project</u>	The scientific project that produced the data.	metadata/project	/gmi:MI_Metadata and/or /gmi:MI_Metadata

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			DS_Association and/or /gmi:MI_Metadata
<u>processing_level</u>	A textual description of the processing (or quality control) level of the data.	metadata/documentation[@type="processing_level"]	
<u>acknowledgement</u>	A place to acknowledge various type of support for the project that produced this data.	metadata/documentation[@type="funding"]	/gmi:MI_Metadata
geospatial_bounds	Describes geospatial extent using any of the geometric objects (2D or 3D) supported by the <u>Well-Known Text</u> (WKT) format.		
<u>geospatial_lat_min</u>	Describes a simple latitude/longitude bounding box. geospatial_lat_min specifies the southernmost latitude;	metadata/geospatialCoverage/northsouth/start	/gmi:MI_Metadata
<u>geospatial_lat_max</u>	geospatial_lat_max specifies the northernmost latitude;	metadata/geospatialCoverage/northsouth/size	/gmi:MI_Metadata
<u>geospatial_lon_min</u>	geospatial_lon_min specifies the westernmost longitude;	metadata/geospatialCoverage/eastwest/start	/gmi:MI_Metadata
<u>geospatial_lon_max</u>	geospatial_lon_max specifies the easternmost longitude of the bounding box. The values of geospatial_lon_min and geospatial_lon_max reflect the actual longitude data values. Cases where geospatial_lon_min is greater than geospatial_lon_max indicate the bounding box	metadata/geospatialCoverage/eastwest/size	/gmi:MI_Metadata

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	extends from geospatial_lon_max, through the longitude range discontinuity meridian (either the antimeridian or Prime Meridian), to geospatial_lon_min. For a more detailed geospatial coverage, see the suggested geospatial attributes .		
<u>geospatial_vertical_min</u>	Describes a simple vertical bounding box. For a more detailed geospatial coverage, see the suggested geospatial attributes .	metadata/geospatialCoverage/updown/start	/gmi:MI_Metadata
<u>geospatial_vertical_max</u>		metadata/geospatialCoverage/updown/size	/gmi:MI_Metadata
<u>time_coverage_start</u>	Describes the temporal coverage of the data as a time range.	metadata/timeCoverage/start	/gmi:MI_Metadata
<u>time_coverage_end</u>		metadata/timeCoverage/end	/gmi:MI_Metadata
<u>time_coverage_duration</u>		metadata/timeCoverage/duration	/gmi:MI_Metadata
<u>time_coverage_resolution</u>		metadata/timeCoverage/resolution	
<u>standard_name_vocabulary</u>	The name of the controlled vocabulary from which variable standard names are taken.	metadata/variables@vocabulary	/gmi:MI_Metadata
<u>license</u>	Describe the restrictions to data access and distribution.	metadata/documentation[@type="rights"]	/gmi:MI_Metadata

Suggested

Attribute	Description	THREDDS	
<u>contributor_name</u>	The name and role of any individuals or institutions that contributed to the creation of	metadata/contributor	/gmi:MI_Metadata/gmd:contributor
<u>contributor_role</u>		metadata/contributor@role	/gmi:MI_Metadata/gmd:role="principalInvestigator"

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	this data.		
<u>publisher_name</u>	The data publisher's name, URL, and email. The publisher may be an individual or an institution.	metadata/publisher/name	/gmi:MI_Metadata/gmd:CI_RoleCode="publish" and/or /gmi:MI_Metadata/gmd:CI_RoleCode="publish"
<u>publisher_url</u>		metadata/publisher/contact@url	/gmi:MI_Metadata/gmd:CI_RoleCode="publish" and/or /gmi:MI_Metadata/gmd:CI_RoleCode="publish"
<u>publisher_email</u>		metadata/publisher/contact@email	/gmi:MI_Metadata/gmd:CI_RoleCode="publish" and/or /gmi:MI_Metadata/gmd:CI_RoleCode="publish"
<u>date_modified</u>	The date on which this data was last modified.	metadata/date[@type="modified"]	/gmi:MI_Metadata/gmd:dateType/gmd:CI_Dates
<u>date_issued</u>	The date on which this data was formally issued.	metadata/date[@type="issued"]	/gmi:MI_Metadata/gmd:dateType/gmd:CI_Dates
<u>geospatial_lat_units</u>	Further refinement of the geospatial bounding box can be provided by using these units and resolution attributes.	metadata/geospatialCoverage/northsouth/units	/gmi:MI_Metadata/gmd:GeographicBoundingBox
<u>geospatial_lat_resolution</u>		metadata/geospatialCoverage/northsouth/resolution	/gmi:MI_Metadata/gmd:GeographicBoundingBox
<u>geospatial_lon_units</u>		metadata/geospatialCoverage/eastwest/units	/gmi:MI_Metadata/gmd:GeographicBoundingBox
<u>geospatial_lon_resolution</u>		metadata/geospatialCoverage/eastwest/resolution	/gmi:MI_Metadata/gmd:GeographicBoundingBox
<u>geospatial_vertical_units</u>		metadata/geospatialCoverage/updown/units	/gmi:MI_Metadata/gmd:GeographicBoundingBox
<u>geospatial_vertical_resolution</u>		metadata/geospatialCoverage/updown/resolution	/gmi:MI_Metadata/gmd:GeographicBoundingBox
<u>geospatial_vertical_positive</u>		metadata/geospatialCoverage@zpositive	

Highly Recommended Variable Attributes

Attribute	Description	THREDDS	
<u>long_name</u>	A long descriptive name for the variable (not necessarily from a controlled vocabulary).	metadata/variables/variable@vocabulary_name	At present the ISO 19115-2 Standard supports keywords as keywords with the appropriate thesaurus.
<u>standard_name</u>		metadata/variables/variable@vocabulary_name	

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	A long descriptive name for the variable taken from a controlled vocabulary of variable names.		
<u>units</u>	The units of the variables data values. This attributes value should be a valid udunits string.	metadata/variables/variable@units	/gmi:MI_Metadata/gmd:contentInfo/gmi:

Conformance Test

A [Conformance Test](#) is available for this convention.

Examples

Attribute Names

This sample includes the attribute names as the values. It can be used to test transforms.

```
<?xml version='1.0' encoding='UTF-8'?>
<netcdf xmlns="http://www.unidata.ucar.edu-namespaces/netcdf/ncml-2.2">
  <!-- Identifier / Metadata Reference -->
  <attribute name="id" value="UnidataDataDiscoveryAttributes"/>
  <attribute name="naming_authority" value="naming_authority"/>
  <attribute name="Metadata_Conventions" value="Unidata Dataset Discovery v1.0"/>
  <attribute name="Metadata_Link" value="URL for full metadata record"/>
  <!-- Service Endpoints -->
  <attribute name="thredds_netcdfsubset_service" value="thredds_netcdfsubset_service" />
  <attribute name="thredds_opendap_service" value="thredds_opendap_service" />
  <attribute name="thredds_wms_service" value="thredds_wms_service"/>
  <attribute name="thredds_wcs_service" value="thredds_wcs_service"/>
  <!-- Text Search -->
  <attribute name="title" value="title"/>
  <attribute name="summary" value="summary"/>
  <attribute name="keywords" value="keywords"/>
  <attribute name="keywords_vocabulary" value="keyword_vocabulary"/>
  <attribute name="standard_name_vocabulary" value="standard_name_vocabulary"/>
  <attribute name="history" value="history"/>
  <attribute name="comment" value="comment"/>
  <!-- Extent Search -->
  <attribute name="geospatial_lat_min" value="-89.999 " type="float"/>
  <attribute name="geospatial_lat_max" value="89.999 " type="float"/>
  <attribute name="geospatial_lon_min" value="-99.999 " type="float"/>
  <attribute name="geospatial_lon_max" value="99.999 " type="float"/>
  <attribute name="geospatial_vertical_min" value="-99.99 " type="float"/>
  <attribute name="geospatial_vertical_max" value="99.99 " type="float"/>
```

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```
<attribute name="time_coverage_start" value="1888-08-08T08:08:08Z"/>
<attribute name="time_coverage_end" value="1777-07-07T07:07:07Z"/>
<!-- Other Extent Information -->
<attribute name="geospatial_lat_units" value="geospatial_lat_units"/>
<attribute name="geospatial_lat_resolution" value="8.888" type="float"/>
<attribute name="geospatial_lon_units" value="geospatial_lon_units"/>
<attribute name="geospatial_lon_resolution" value="9.999" type="float"/>
<attribute name="geospatial_vertical_units" value="geospatial_vertical_units"/>
<attribute name="geospatial_vertical_resolution" value="999.0" type="float"/>
<attribute name="geospatial_vertical_positive" value="geospatial_vertical_positive"/>
<attribute name="time_coverage_duration" value="P2Y2M2D"/>
<attribute name="time_coverage_resolution" value="P1Y1M1D"/>
<!-- Creator Search -->
<attribute name="acknowledgment" value="acknowledgment"/>
<attribute name="creator_email" value="creator_email"/>
<attribute name="creator_name" value="creator_name"/>
<attribute name="creator_url" value="creator_url"/>
<attribute name="date_created" value="1666-06-06T06:06:06Z"/>
<attribute name="date_modified" value="1999-09-09T09:09:09Z"/>
<attribute name="date_issued" value="2111-01-01T01:01:01Z"/>
<attribute name="institution" value="institution"/>
<attribute name="project" value="project"/>
<!-- Contributor Search -->
<attribute name="contributor_name" value="contributor_name"/>
<attribute name="contributor_role" value="contributor_role"/>
<!-- Publisher Search -->
<attribute name="publisher_name" value="publisher_name"/>
<attribute name="publisher_url" value="publisher_url"/>
<attribute name="publisher_email" value="publisher_email"/>
<!-- Other Attributes -->
<attribute name="processing_level" value="processing_level"/>
<attribute name="license" value="license"/>
<attribute name="cdm_data_type" value="cdm_data_type"/>
<variable name="tv" type="float" shape="depdp">
    <attribute name="units" value="units"/>
    <attribute name="name" value="testVariable"/>
    <attribute name="long_name" value="Test Variable - long name"/>
    <attribute name="standard_name" value="test_variable_standard_name"/>
</variable>
</netcdf>
```

XPaths

Sometimes an example with XPaths is useful. Note that this example includes service endpoints in the Service Endpoints section that are added by the ncISO capability in the THREDDS Data Server. *These are not typically included in the netCDF file:*

```
<netcdf xmlns="http://www.unidata.ucar.edu/namespaces/netcdf/ncml-2.2">
    <!-- Identifier / Metadata Reference -->
    <attribute name="id" value="netcdf/attribute/@name=id"/>
    <attribute name="naming_authority" value="netcdf/attribute/@name=naming_authority"/>
    <attribute name="Metadata_Conventions" value="netcdf/attribute/@name=Metadata_Conventions"/>
    <attribute name="Metadata_Link" value="netcdf/attribute/@name=Metadata_Link"/>
    <!-- Service Endpoints -->
    <attribute name="thredds_netcdfsubset_service" value="netcdf/attribute/@name=thredds_netcdfsubset_service"/>
    <attribute name="thredds_opendap_service" value="netcdf/attribute/@name=thredds_opendap_service"/>
    <attribute name="thredds_wms_service" value="netcdf/attribute/@name=thredds_wms_service"/>
    <attribute name="thredds_wcs_service" value="netcdf/attribute/@name=thredds_wcs_service"/>
    <!-- Text Search -->
    <attribute name="title" value="netcdf/attribute/@name=title"/>
    <attribute name="summary" value="netcdf/attribute/@name=summary"/>
    <attribute name="keywords" value="netcdf/attribute/@name=keywords"/>
```

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```
<attribute name="keywords_vocabulary" value="netcdf/attribute/@name=keyword_vocabulary"/>
<attribute name="standard_name_vocabulary" value="netcdf/attribute/@name=standard_name_vocabulary"/>
<attribute name="history" value="netcdf/attribute/@name=history"/>
<attribute name="comment" value="netcdf/attribute/@name=comment"/>
<!-- Extent Search -->
<attribute name="geospatial_lat_min" value="netcdf/attribute/@name=geospatial_lat_min" type="float"/>
<attribute name="geospatial_lat_max" value="netcdf/attribute/@name=geospatial_lat_max" type="float"/>
<attribute name="geospatial_lon_min" value="netcdf/attribute/@name=geospatial_lon_min" type="float"/>
<attribute name="geospatial_lon_max" value="netcdf/attribute/@name=geospatial_lon_max" type="float"/>
<attribute name="geospatial_vertical_min" value="netcdf/attribute/@name=geospatial_vertical_min"/>
<attribute name="geospatial_vertical_max" value="netcdf/attribute/@name=geospatial_vertical_max"/>
<attribute name="time_coverage_start" value="netcdf/attribute/@name=time_coverage_start"/>
<attribute name="time_coverage_end" value="netcdf/attribute/@name=time_coverage_end"/>
<!-- Other Extent Information -->
<attribute name="geospatial_lat_units" value="netcdf/attribute/@name=geospatial_lat_units"/>
<attribute name="geospatial_lat_resolution" value="netcdf/attribute/@name=geospatial_lat_resolution"/>
<attribute name="geospatial_lon_units" value="netcdf/attribute/@name=geospatial_lon_units"/>
<attribute name="geospatial_lon_resolution" value="netcdf/attribute/@name=geospatial_lon_resolution"/>
<attribute name="geospatial_vertical_units" value="netcdf/attribute/@name=geospatial_vertical_units"/>
<attribute name="geospatial_vertical_resolution" value="netcdf/attribute/@name=geospatial_vertical_resolution"/>
<attribute name="geospatial_vertical_positive" value="netcdf/attribute/@name=geospatial_vertical_positive"/>
<attribute name="time_coverage_duration" value="netcdf/attribute/@name=time_coverage_duration"/>
<attribute name="time_coverage_resolution" value="netcdf/attribute/@name=time_coverage_resolution"/>
<!-- Creator Search -->
<attribute name="acknowledgment" value="netcdf/attribute/@name=acknowledgment"/>
<attribute name="creator_email" value="netcdf/attribute/@name=creator_email"/>
<attribute name="creator_name" value="netcdf/attribute/@name=creator_name"/>
<attribute name="creator_url" value="netcdf/attribute/@name=creator_url"/>
<attribute name="date_created" value="netcdf/attribute/@name=date_created"/>
<attribute name="date_modified" value="netcdf/attribute/@name=date_modified"/>
<attribute name="date_issued" value="netcdf/attribute/@name=date_issued"/>
<attribute name="institution" value="netcdf/attribute/@name=institution"/>
<attribute name="project" value="netcdf/attribute/@name=project"/>
<!-- Contributor Search -->
<attribute name="contributor_name" value="netcdf/attribute/@name=contributor_name"/>
<attribute name="contributor_role" value="netcdf/attribute/@name=contributor_role"/>
<!-- Publisher Search -->
<attribute name="publisher_name" value="netcdf/attribute/@name=publisher_name"/>
<attribute name="publisher_url" value="netcdf/attribute/@name=publisher_url"/>
<attribute name="publisher_email" value="netcdf/attribute/@name=publisher_email"/>
<!-- Other Attributes -->
<attribute name="processing_level" value="netcdf/attribute/@name=processing_level"/>
<attribute name="license" value="netcdf/attribute/@name=license"/>
<attribute name="cdm_data_type" value="netcdf/attribute/@name=cdm_data_type"/>
<variable name="netcdf/variable/@name" type="netcdf/variable/@type" shape="netcdf/variable/@shape">
  <attribute name="units" value="netcdf/variable/attribute/@name=units"/>
  <attribute name="long_name" value="netcdf/variable/attribute/@name=long_name"/>
  <attribute name="standard_name" value="netcdf/variable/attribute/@name=standard_name"/>
</variable>
<variable name="netcdf/variable2/@name" type="netcdf/variable2/@type" shape="netcdf/variable2/@shape">
  <attribute name="units" value="netcdf/variable2/attribute/@name=units"/>
  <attribute name="long_name" value="netcdf/variable2/attribute/@name=long_name"/>
  <attribute name="standard_name" value="netcdf/variable2/attribute/@name=standard_name"/>
</variable>
</netcdf>
```

Real-World Example

This NcML, taken from a very well documented CoastWatch file, includes real-world examples for all of the recommended attributes:

```
<netcdf xmlns="http://www.unidata.ucar.edu-namespaces/netcdf/ncml-2.2">
```

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```
<!-- Identifier / Metadata Reference -->
<attribute name="id" value="LMHchlaS8day_20100129000000"/>
<attribute name="naming_authority" value="gov.noaa.pfel.coastwatch"/>
<attribute name="Metadata_Conventions" value="Unidata Dataset Discovery v1.0"/>
<attribute name="Metadata_Link" value="URL for full metadata record"/>
<!-- Text Search -->
<attribute name="title" value="Chlorophyll-a, Aqua MODIS, NPP, 0.05 degrees, Global, Science Qua
<attribute name="summary"
  value="NOAA CoastWatch distributes chlorophyll-a concentration data from NASA's Aqua Space
  Measurements are gathered by the Moderate Resolution Imaging Spectroradiometer (MODIS) carried
  This is Science Quality data."/>
<attribute name="keywords" value="EARTH SCIENCE > Oceans > Ocean Chemistry > Chlorophyll"/>
<attribute name="keywords_vocabulary" value="GCMD Science Keywords"/>
<attribute name="standard_name_vocabulary" value="CF-1.0"/>
<attribute name="history" value="NASA GSFC (G. Feldman): 2010-02-22T22:48:46Z NOAA CoastWatch (W
<attribute name="comment" value="Text comment"/>
<!-- Extent Search -->
<attribute name="geospatial_lat_min" value="-90.0 " type="double"/>
<attribute name="geospatial_lat_max" value="90.0 " type="double"/>
<attribute name="geospatial_lon_min" value="0.0 " type="double"/>
<attribute name="geospatial_lon_max" value="360.0 " type="double"/>
<attribute name="geospatial_vertical_min" value="0.0 " type="double"/>
<attribute name="geospatial_vertical_max" value="0.0 " type="double"/>
<attribute name="geospatial_vertical_positive" value="up"/>
<attribute name="time_coverage_end" value="2010-02-02T00:00:00Z"/>
<attribute name="time_coverage_start" value="2010-01-25T00:00:00Z"/>
<!-- Other Extent Information -->
<attribute name="geospatial_lat_units" value="degrees_north"/>
<attribute name="geospatial_lat_resolution" value="0.041676313961565174" type="double"/>
<attribute name="geospatial_lon_units" value="degrees_east"/>
<attribute name="geospatial_lon_resolution" value="0.04167148975575877" type="double"/>
<attribute name="geospatial_vertical_units" value="m"/>
<attribute name="geospatial_vertical_resolution" value="1.0" type="double"/>
<attribute name="time_coverage_duration" value="P1D"/>
<attribute name="time_coverage_resolution" value="PT1M"/>
<!-- Creator Search -->
<attribute name="acknowledgment" value="NOAA NESDIS COASTWATCH, NOAA SWFSC ERD"/>
<attribute name="creator_email" value="dave.foley@noaa.gov"/>
<attribute name="creator_name" value="NOAA CoastWatch, West Coast Node"/>
<attribute name="creator_url" value="http://coastwatch.pfel.noaa.gov"/>
<attribute name="date_created" value="2010-02-22Z"/>
<attribute name="date_modified" value="2010-03-22Z"/>
<attribute name="date_issued" value="2010-02-22Z"/>
<attribute name="institution" value="NOAA CoastWatch, West Coast Node"/>
<attribute name="project" value="CoastWatch (http://coastwatch.noaa.gov)"/>
<!-- Contributor Search -->
<attribute name="contributor_name" value="NASA GSFC (G. Feldman)"/>
<attribute name="contributor_role" value="Source of level 2 data."/>
<!-- Publisher Search -->
<attribute name="publisher_email" value="dave.foley@noaa.gov"/>
<attribute name="publisher_name" value="NOAA CoastWatch, West Coast Node"/>
<attribute name="publisher_url" value="http://coastwatch.pfel.noaa.gov"/>
<!-- Other Attributes -->
<attribute name="processing_level" value="3"/>
<attribute name="license"
  value="The data may be used and redistributed for free but is not intended for legal use, since it is provided 'as is' without warranty of any kind."/>
<attribute name="cdm_data_type" value="Grid"/>
</netcdf>
```

NetCDF Climate and Forecast (CF) Metadata Conventions

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The [NetCDF Climate and Forecast \(CF\) Metadata Conventions](#) are designed to promote the interoperable processing and sharing of data from netCDF files. They are focused on data *use* while the NetCDF Attribute Conventions are focused on data *discovery*. Many of the discovery attributes that are related to extents can be calculated from the CF information:

geospatial_lat_min, geospatial_lat_max, geospatial_lat_units, geospatial_lat_res
geospatial_lon_min, geospatial_lon_max, geospatial_lon_units, geospatial_lon_res
geospatial_vertical_min, geospatial_vertical_max, geospatial_vertical_units, geospatial_vertical_res,
geospatial_vertical_pos
time_coverage_start, time_coverage_end, time_coverage_units, time_coverage_duration, time_coverage_res

Note: We recommend explicitly listing these attributes in the file even though they can be calculated from the CF information in order to facilitate direct access to this information by tools that do not understand the CF Conventions.

Open Geospatial Consortium Catalog Service for the Web (CSW)

The [OGC CSW Service](#) includes ten core queryable elements that must be supported in all instances. CSW Profiles map these queryables to elements in various standards. The ISO Mappings are described in Section 7.2.3.1,Table 6 of OpenGIS® Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile ([OGC 07-045](#)). The core queryables mapping is included in the Table above. An additional "any text" queryable covers all text in a record. Two core queryables are not covered by the NetCDF Attribute Convention for Dataset Discovery: Format and CRS.

ISO Translation Notes

The translation between the Attribute Conventions for Data Discovery is subject to a number of assumptions or conventions described here.

People

The ACDD includes several types of people:

ACDD Attributes	ISO Locations
creator_name, creator_email, creator_url, institution	citation/citedResponsibleParty role=originator, point of contact, and metadata contact
contributor_name, contributor_role	citation/citedResponsibleParty role=originator (may need adjustment)
publisher_name, publisher_email, publisher_url	distributor and Data Center keyword
project	Project keyword, aggregation information (initiative type = project)

Keywords

The ACDD includes several attributes that make sense as keywords in ISO:

ACDD Attributes	ISO Locations
-----------------	---------------

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keywords	theme keywords with thesaurus given by the keywords_vocabulary attribute
project	Project keyword with unknown thesaurus and aggregation information (initiative type = project)
publisher_name	Data Center keyword with unknown thesaurus
standard_names for parameters	theme keywords with thesaurus = standard_name_vocabulary
publisher_name, publisher_email, publisher_url	distributor and Data Center keyword

Translation Revisions

Several changes were introduced into [Version 2.0.2](#) of the stylesheet for transforming NcML to ISO in order to improve the rubric score for the resulting ISO metadata. The changes included:

1. Including netcdf/@location in transform as distribution onlineResource
2. Added tagname to writeResponsibleParty so that responsibleParties with

different UML roles could be supported (i.e. contact vs. distributor)

1. Added urlName and urlDescription to writeResponsibleParty to add

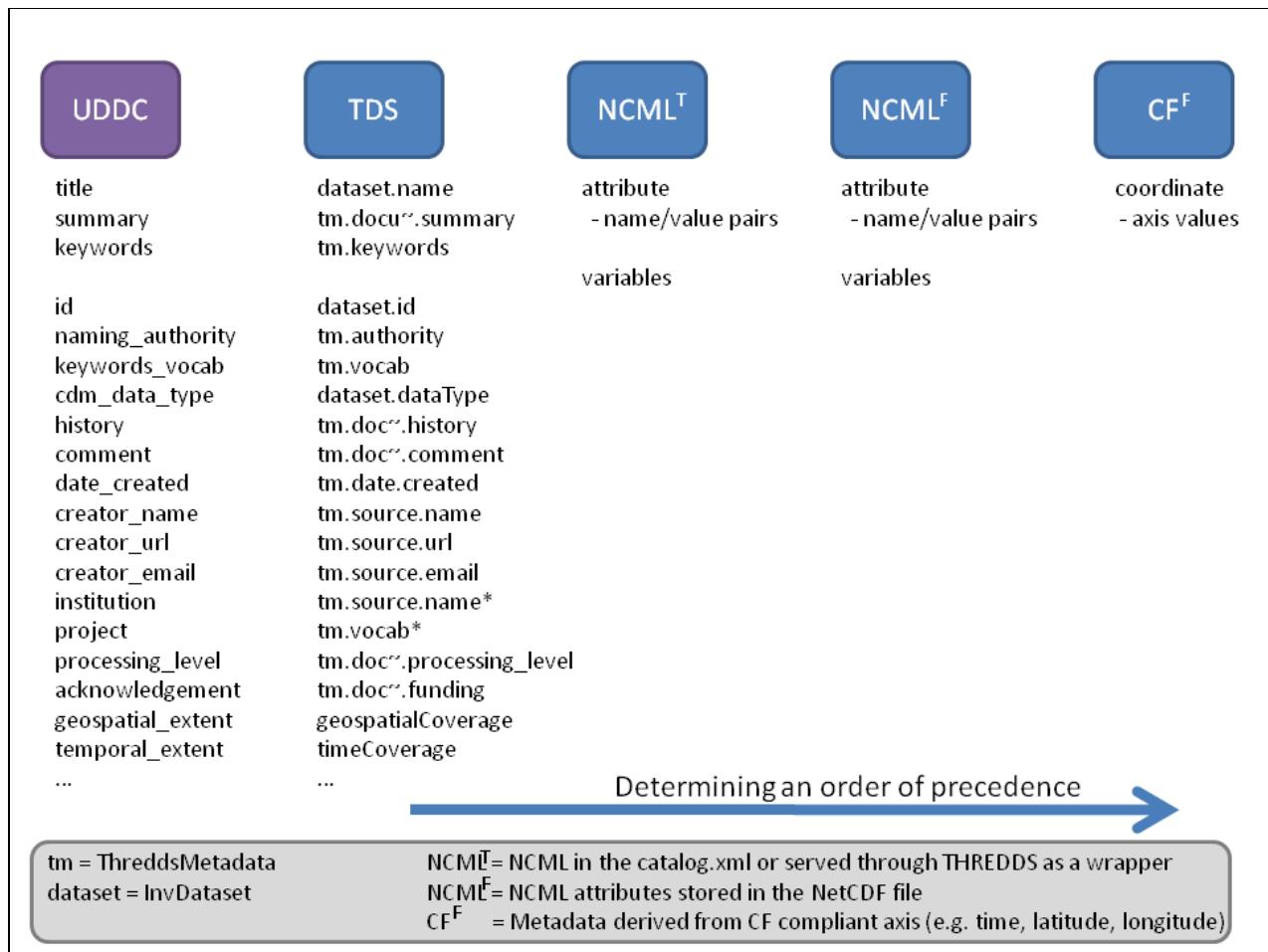
content to the onlineResource

1. Moved publisher from citation to distributor and included publisher_name as a dataCenter keyword.
2. Added project as a keyword with type=project
3. Added distributionInfo section to ISO if publisher or location exist.

Determining an Order of Precedence

There can be conflicting information available from different sources within the THREDDS and CDM data models. The diagram below seeks to determine an order of precedence for what is recorded in the ncISO metadata when those attributes conflict.

NetCDF_Attribute_Convention_for_Dataset_Discovery



A key part of this discussion is the ability to see identify potentially conflicting metdata between the differenc sources within THREDDS and NetCDF. Below we propose using groups to identify in the NCML what sources contain the relevant metadata that will be used in the ISO translation.

```

<?xml version="1.0" encoding="UTF-8"?>
<netcdf xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.unidata.ucar.edu/namespaces/netcdf/ncml-2.2 ../XSD/ncml-2.2.xsd"
  xmlns="http://www.unidata.ucar.edu/namespaces/netcdf/ncml-2.2"
  location="http://localhost:8080/thredds/dodsC/test/crm_v1.nc">

  <!-- Metadata from the netCDF or NCML file global attributes -->
  <attribute name="Conventions" value="CF-1.4" />
  <attribute name="title" value="crm_v1.grd" />
  <attribute name="history" value="xyz2grd -R-80/-64/40/48 -I3c -Gcrm_v1.grd" />
  <attribute name="GMT_version" value="4.5.1 [64-bit]" />
  <attribute name="creator_name" value="David Neufeld"/>
  <attribute name="creator_email" value="David.Neufeld@noaa.gov"/>
  <attribute name="geospatial_lon_units" value="degrees_east" />
  <attribute name="geospatial_lat_units" value="degrees_north" />
  <attribute name="geospatial_lon_min" type="float" value="-80.0" />
  <attribute name="geospatial_lon_max" type="float" value="-64.0" />
  <attribute name="geospatial_lat_max" type="float" value="48.0" />
  <attribute name="geospatial_lat_min" type="float" value="40.0" />
  <attribute name="geospatial_lon_resolution" type="double" value="8.33E-4" />
  <attribute name="geospatial_lat_resolution" type="double" value="8.33E-4" />

  <!-- Metadata calculated from the netCDF file axes based on CF conventions -->
  <group name="CFMetadata">
    <attribute name="geospatial_lon_min" value="-80.0" type="float" />
  
```

NetCDF_Attribute_Convention_for_Dataset_Discovery

```
<attribute name="geospatial_lat_min" value="40.0" type="float" />
<attribute name="geospatial_lon_max" value="-64.0" type="float" />
<attribute name="geospatial_lat_max" value="48.0" type="float" />
<attribute name="geospatial_lon_units" value="degrees_east" />
<attribute name="geospatial_lat_units" value="degrees_north" />
<attribute name="geospatial_lon_resolution" value="8.332899328159992E-4" />
<attribute name="geospatial_lat_resolution" value="8.332465368190813E-4" />
</group>

<!-- Metadata from the THREDDS catalog dataset --&gt;
&lt;group name="THREDDSMetadata"&gt;
    &lt;attribute name="id" value="crm_v1" /&gt;
    &lt;attribute name="creator_name" value="David Neufeld"/&gt;
    &lt;attribute name="creator_email" value="David.Neufeld@noaa.gov"/&gt;
    &lt;attribute name="data_distribution" value="http://localhost:8080/thredds/dodsC/test/crm_v1.nc" /&gt;
    &lt;attribute name="wms_service" value="http://localhost:8080//thredds/wms/crm/crm_vol9.nc" /&gt;
    &lt;attribute name="wcs_service" value="http://localhost:8080//thredds/wcs/crm/crm_vol9.nc" /&gt;
&lt;/group&gt;

<!-- Metadata from the ncISO service --&gt;
&lt;group name="NCISOMetadata"&gt;
    &lt;attribute name="metadata_creation" value="2011-04-19" /&gt;
&lt;/group&gt;

&lt;dimension name="x" length="19201" /&gt;
&lt;dimension name="y" length="9601" /&gt;

&lt;variable name="z" shape="y x" type="float"&gt;
    &lt;attribute name="long_name" value="z" /&gt;

    &lt;attribute name="_FillValue" type="float" value="NaN" /&gt;
    &lt;attribute name="actual_range" type="double" value="-2754.39990234375 1903.0" /&gt;
    &lt;attribute name="units" value="meters" /&gt;
    &lt;attribute name="positive" value="up" /&gt;
&lt;/variable&gt;
&lt;variable name="x" shape="x" type="double"&gt;
    &lt;attribute name="long_name" value="x" /&gt;
    &lt;attribute name="actual_range" type="double" value="-80.0 -64.0" /&gt;
    &lt;attribute name="units" value="degrees_east" /&gt;

    &lt;attribute name="_CoordinateAxisType" value="Lon" /&gt;
&lt;/variable&gt;
&lt;variable name="y" shape="y" type="double"&gt;
    &lt;attribute name="long_name" value="y" /&gt;
    &lt;attribute name="actual_range" type="double" value="40.0 48.0" /&gt;
    &lt;attribute name="units" value="degrees_north" /&gt;
    &lt;attribute name="_CoordinateAxisType" value="Lat" /&gt;
&lt;/variable&gt;
&lt;/netcdf&gt;</pre>
```